clear, but it is believed that mutations act like enzymes and affect the body chemically. Like most mutations, the macromelanophore mutation was probably harmful and most likely lethal, because most mutations upset an organism's established genetic balance and this, in turn, upsets the biochemical processes in the developing organism.

Prior to the spotted mutation's successful establishment in the platyfish population, mutations which were to serve, in part, as modifiers and controllers of the activity of macromelanophores must have accumulated first, and then neutralized the lethal effects of the spotted mutants when they reoccurred. The platyfish had to be made ready genetically for the coming of the spotted mutations by first accumulating macromelanophore controlling genes. When ready, the platyfish "accepted" macromelanophores without danger to themselves. However, when a genetically balanced spotted platyfish from the Rio Coatzacoalcos is mated with another normal member from the Rio Jamapa, the new recombination of genetic modifiers of macromelanophore growth is not in balance in the spotted hybrids, and these large pigment cells grow atypically. The hereditary effects of macromelanophores can be demonstrated genetically, as well as the effects of gene modifiers which influence macromelanophore growth patterns. The macromelanophores are genetically labile cells subject to normal or typical growth by a series of modifying genes.

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Discussion by W. E. Heston, National Cancer Institute, Bethesda, Md.

The observations of Dr. Gordon are of especial interest to one studying the inheritance of cancer in mice because of the parallels to his observations that have occurred with mice. In general one can expect a greater variety of tumors to occur in hybrids between two inbred strains of mice than occur in either inbred strain. Little reported that in the F_1 hybrids resulting from crossing *Mus bactrianus* with strain C_{57} black *(Mus musculus)* the incidence of non-epithelial tumors was 39.7%, whereas that for the C_{57} black mice was 13.2% and no such tumors were recorded for the *Mus bactrianus* stock. In the history our experimental colony, 10 mice with tumors of the Harderian gland have occurred, and all of these have been hybrids from a specific cross (strain $C_3H \times$ strain C_{57} black). While this is a rare tumor, its occurrence in these specific hybrids and not in either parent strain or any of the other strains of the colony is remarkable.

The variation in degree of atypical pigment cell growth from melanosis to true melanomas effected by the genotypes of the different types of hybrid platyfish might also be compared with the variation in degree of expression of different genotypes affecting tumor formation in the mouse. This is particularly well illustrated with induced lung tumors. One observes from few to many nodules per animal, depending upon its genotype. Dr. Gordon's observation of melanosis in certain types of hybrids compared with true melanomas in other types suggests that with the carcinogen 5, 9, 10—trimethyl—1, 2—benzanthracene that produces pigmented foci in the skin of mice of certain strains, one might be able to produce true melanomas in other strains or hybrid types with a more suitable genotype.

Third Session: Physiological.

Introduction.

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The papers in this group hold a place of basic interest. We have had the abnormal pigment cell and its destructive effect on the organism discussed from the pragmatic empirical medical approach. We have had the genetic control of the cell within the organism discussed. Now we turn to the normal cell and its biologic behavior, considered as acting as an individual entity functioning cooperatively with other cells within the organism, its growth differentiation and regeneration, and the part it plays as a normal component of the organism.

It is this behavior that in the end will serve as a criterion for all theories of its structure or of the physical and chemical mechanisms posited as inherent in the cell. This is how it behaves as a biological entity and it is this behavior that we are seeking to understand by the biochemical or biophysical approach. Its abnormal behavior, as for instance in cancer, will eventually also be comprehended as a part of this story.